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Glenn Safety Manual – Chapter 17

Construction Safety and Health

Approved by: QS/Chief, Safety and Health Division

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Cleveland, OH 44135**

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Page 1 of 36

Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

Change Record

Rev.	Effective Date	Expiration Date	GRC25, Change Request #	Description
B	12/19/2012	12/19/2017	13	Bi-annual review/revision
Change 1	4/14/2014	12/19/2017	N/A	Administrative change to add front cover and change history log to comply with NPR 1400.1. Deleted “Authority for the procedures, responsibilities, and requirements in this chapter are derived from the following” and inserted “The GRC shall follow the requirements of the following” in Section 4.0 Policy.
Change 2	9/30/2015	12/19/2017	N/A	Administrative change to remove hyperlinks.
Change 3	6/29/2017	12/19/2018	N/A	Administrative change to extend the expiration date to December 19, 2018, to allow more time to address the chapter revisions; changed document number from GLM-1700.1.25 to GLP-QS-8715.1.25.
Change 4	9/18/2017	12/19/2018	N/A	Administrative change to correct NPR 8719.7: Facility System Safety Guidebook to NASA Standard NASA-STD-8719.7 and NPR 8719.11, Safety Standard for Fire Protection to NASA Standard NASA-STD-8719.11.
C	12/14/2018	12/14/2023	18-018	Five year chapter review and update.

****Include all information for each revision. Do not remove old revision data. Add new rows to table when space runs out by pressing the tab key in the last row, far right column.**

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

Contents

1.0	PURPOSE.....	4
2.0	APPLICABILITY	4
3.0	BACKGROUND	4
4.0	POLICY	4
5.0	RESPONSIBILITIES	4
5.1	Contracting Officer.....	4
5.3	Contracting Officer’s Representative (COR).....	5
5.4	Construction Manager/Construction Inspector (CM/CI), Facilities Division	6
5.5	SHeD Construction Technical Team	6
5.6	Waste Management	6
5.7	Authority Having Jurisdiction (AHJ)	6
5.8	Construction Contractors, Subcontractors, Maintenance Contractors, and Prime Contractors	6
5.9	Building Manager	6
5.10	Office of Protective Services	7
5.11	Chief, Project Management Branch.....	7
6.0	REQUIREMENTS	7
6.1	Construction of Facilities (CoF) Design (<i>NPR 8715.3, NASA-STD- 8719.7 and NPD 8820.2</i>)	7
6.2	Site-Specific Health and Safety Plan (HASP) (<i>NPR 8715.3 and NPR 8820.2</i>)	7
6.2.1	Contractor HASP Requirements.....	7
6.2.2	SHeD Requirements	8
6.2.3	COR Requirements	8
6.3	Hazard Communication (<i>29 CFR 1926</i>).....	8
6.3.1	Contractor Requirements.....	8
6.3.2	SHeD Requirements	8
6.3.3	COR Requirements	8
6.4	Occupational Safety and Health Administration (OSHA) Competent Person Verification (<i>29 CFR 1926</i>).....	8
6.5	Contractor Training Requirements (<i>29 CFR 1926</i>)	8
6.6	Inspection (<i>NPR 8715.3 and NPD 8820.2</i>).....	9
6.6.2	COR and/or CM/CI Technician Inspections	9
6.7	Emergency Response Procedures	9
6.7.1	Lewis Field.....	9
6.7.2	Plum Brook Station	9
6.8	Mishap Investigation (<i>NPR 8621.1</i>)	10
6.9	Signs, Signals and Barricades (<i>29 CFR 1926</i>).....	10
6.10	Final Inspection (<i>NASA–STD–8719.7 and NPR 8715.3</i>).....	10
7.0	RECORDS.....	11
8.0	REFERENCES	11
	APPENDIX A —DEFINITIONS AND ACRONYMS	12
	APPENDIX B —SHORT-DURATION HASP TEMPLATE.....	13
	APPENDIX C —MINIMUM CONTENT FOR SITE-SPECIFIC HEALTH AND SAFETY PLANS	15
	APPENDIX D —GENERAL SAFETY AND HEALTH SPECIFICATION	22
	APPENDIX E —HEALTH AND SAFETY PLAN (HASP) SUBMITTAL PROCESS FLOWCHART	36

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

Chapter 17—Construction Safety and Health

NOTE: The current version of this chapter is maintained and approved by the Safety and Health Division (SHeD). The last revision date of this chapter was December 2018. The current version is maintained on the Glenn Research Center (GRC) intranet within the BMS Library. Approved by Chief of Safety and Health Division.

1.0 PURPOSE

This chapter describes policies and minimal safety and health requirements for all construction activities at the NASA Glenn Research Center (GRC) at Lewis Field (LF) and Plum Brook Station (PBS). Persons engaged in construction activities shall perform work carefully and safely; meet or exceed the minimum safety and health requirements defined herein; and comply with Federal, State, and local codes and standards where required, including NASA Agency and Center policies and procedures.

2.0 APPLICABILITY

The responsibilities and requirements in this chapter apply to all GRC civil servant and contractor employees, other Government agency employees, visitors, and other organizations who perform construction activities within the confines of GRC. This chapter also applies to supply contracts for construction services.

“In this chapter, all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms “may” or “can” denote discretionary privilege or permission, “should” denotes a good practice and is recommended, but not required, “will” denotes expected outcome, and “are” or “is” denotes descriptive material.

3.0 BACKGROUND

Construction work includes many inherently hazardous tasks and conditions, such as work at height, excavations, exposure to dust and noise, power tools and equipment, confined spaces, and electricity. Construction workers make up about 8 percent of U.S. workers, but 22 percent of the fatalities—the largest number of fatalities reported for any industry sector. The policies set forth in this chapter were developed to help reduce the level of risk for construction workers.

4.0 POLICY

This document describes the responsibilities and requirements for construction activities at GRC. The contractor shall follow the requirements of the following:

- Title 29 Code of Federal Regulations 1926: Safety and Health Regulations for Construction
- NPR 8820.2: Facility Project Requirements
- NPD 8820.2: Design and Construction of Facilities
- NPR 1800.1: NASA Occupational Health Program Procedures
- NPR 8715.3: NASA General Safety Program Requirements
- NPR 8719.7: Facility System Safety Guidebook
- NPR–8719.11: Safety Standard for Fire Protection
- ANSI A10 – Construction Safety Series

5.0 RESPONSIBILITIES

5.1 Contracting Officer

The Contracting Officer shall be responsible for the following:

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

- Enforcing contractor compliance with all Federal, State, and local codes and regulations, and compliance with all NASA Agency and Center policies
- Ensuring that the Safety and Health Division (SHeD) has reviewed all construction of facilities (CoF) project designs prior to the bid proposal process
- Ensuring that contractors submit a site-specific health and safety plan (HASP) and provide a copy to SHeD for concurrence; and ensuring that the plan is reviewed and concurred with prior to issuance of Notice to Proceed
- Ensuring that all construction contracts contain appropriate safety clauses; see Appendix D
- Coordinating matters regarding proposed safety requirement deviations with the SHeD construction technical lead
- Establishing safety performance elements to be evaluated in contracts where appropriate
- Consulting with SHeD to determine the level of safety professional oversight that shall be required in the construction contract

5.2 Project Manager

The Project Manager shall be responsible for the following:

- Coordinating with SHeD development of safety requirements and objectives for efforts to be contracted, and advising the Contracting Officer of specific contract performance safety concerns or issues
- Ensuring that the Authority Having Jurisdiction (AHJ) and SHeD review all proposed NASA-owned, controlled, or operated facility configuration changes and construction work change orders that have potential life safety, fire protection or safety impacts
- Ensuring that NASA Procedural Requirements are incorporated in all project designs and implemented
- Developing safety requirements and objectives that are clearly delineated in the specifications; and providing specific tasks to the contracting officer for incorporation in the contract, as required
- Ensuring that all construction contracts contain appropriate safety clauses: see Appendix D
- Including SHeD at the beginning of project planning and design, and through the preparation of drawings and specifications processes.
- Participating in the final safety inspection of the work prior to contract completion and occupancy by personnel

5.3 Contracting Officer's Representative (COR)

The COR shall be responsible for the following:

- Providing oversight for construction activities, and ensuring that construction contractors comply with all safety and health requirements
- Participating in the design process
- Ensuring that a preconstruction conference is scheduled, conducted, and that the results are documented
- Conducting regular construction meetings
- Providing SHeD with a copy of each contractor's written, site-specific HASP for acceptance prior to issuance of Notice to Proceed
- Coordinating with NASA operations personnel all activities involving hazardous work area access, mechanical and electrical equipment shutdowns, and certification or operational testing
- Enlisting the support of SHeD to ensure compliance with the Glenn Hazard Communication Program throughout the performance of the contract

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

- Coordinating and participating in contractor construction site inspections
- Ensuring that final inspections include a SHeD representative
- Providing, upon request, a copy of the contractor's daily inspection report to SHeD
- Ensuring that SHeD reviews proposed significant changes to contracts where facility safety is impacted
- Exercising stop work authority when required
- Provide a list of active construction projects to SHeD on a weekly basis

5.4 Construction Manager/Construction Inspector (CM/CI), Facilities Division

CM/CI technicians provide oversight and verification that the contractor is adhering to the concurred task specific health and safety plan at the construction site, and monitors changes in site conditions to verify compliance with NASA and GRC safety requirements.

5.5 SHeD Construction Technical Team

The SHeD construction technical team provides construction safety compliance oversight for all construction activities planned or performed including the following:

- Participating in onsite visits and pre-bid conferences to ensure that potential bidders understand safety provisions
- Assisting the Contracting Officer in evaluating prospective contractors' performance and safety records
- Conducting reviews and providing technical guidance throughout the design process, beginning with project planning and design including preparation of drawings and specifications
- Assisting the contracting officer in evaluating performance and safety record
- Assisting the Contracting Officer as appropriate to apply any special safety provisions to grants or cooperative agreements
- Providing technical advice on matters involving construction safety
- Performing safety, health, and environmental compliance inspections on active construction projects

5.6 Waste Management

Waste Management is responsible for providing technical guidance and oversight on waste management, recycling, and waste reduction, including preparing waste manifests.

5.7 Authority Having Jurisdiction (AHJ)

The AHJ is responsible for formally monitoring fire protection compliance efforts during the various phases of the projects. Following a review and acceptance of fire/life-safety documentation applicable for a given facility, the AHJ issues each occupancy permit.

5.8 Construction Contractors, Subcontractors, Maintenance Contractors, and Prime Contractors

As per NPR 1800.1, construction contractors, subcontractors, maintenance contractors, and prime contractors engaged in construction activities shall meet or exceed the minimum safety and health requirements and shall comply with all other Federal, State, and local codes and standards where required, including NASA Agency and Center policies and/or procedures. Where there is any discrepancy in the regulations, the more stringent rule shall apply.

5.9 Building Manager

The building manager serves as the point of contact between building occupants and outside organizations by:

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

- Providing pertinent information related to building activities, locations of rooms and personnel, etc. that could affect occupants' work routines
- For area clearance work, notifying building occupants of outages (electric, construction activities, water, steam, chilled water, sewer, etc.)
- Reporting any construction activities occurring without authorized, site-specific health and safety plans to SHed.

5.10 Office of Protective Services

Office of Protective Services personnel ensure that NASA contractor employees, other Government agency employees, visitors, and other organizations that perform construction activities within the confines of GRC are properly badged.

5.11 Chief, Project Management Branch

The Chief, Project Management Branch ensures that project managers comply with policies and procedures outlined in this chapter.

6.0 REQUIREMENTS

Construction safety requirements have been established to protect the life, health, and physical well-being of all GRC employees, contractor employees, visitors, and other Government agency employees; to ensure the safety of the public from hazards, incidents, and/or operations from construction activities; to prevent damage of property, supplies, and equipment; and to prevent accidents that might interrupt work, thereby delaying NASA programs and/or negatively affecting NASA property.

6.1 Construction of Facilities (CoF) Design (*NPR 8715.3, NASA-STD- 8719.7 and NPD 8820.2*)

CoF project managers shall include SHed at the beginning of project planning and design, and through the preparation of drawings and specifications processes. In addition, the AHJ shall be involved when the project includes fire protection /life safety issues. SHed involvement shall be formally documented at the following two points:

- Signatures of the SHed construction technical lead on the Project Requirements and the Concept Requirement documents
- Responses to SHed comments and questions

6.2 Site-Specific Health and Safety Plan (HASP) (*NPR 8715.3 and NPR 8820.2*)

A CoF project design team will not issue a Request for Proposal or an Invitation for Bid without the above referenced documentation. Site-Specific Health and Safety Plan (HASP) (*NPR 8715.3 and NPR 8820.2*).

6.2.1 Contractor HASP Requirements

Contractors shall perform the followings:

- Submit a written site-specific HASP to the COR before any construction work is performed. The contractor or the COR shall submit the HASP to SHed for acceptance (see **Error! Reference source not found.**). If the prime contractor is writing the HASP for a subcontractor, the subcontractor shall submit documentation to the Prime contractor concurrence with the HASP and ability to comply with all controls and personal protective equipment requirements specified by the prime contractor, on company letterhead. This documentation shall be kept at the work site and be made available for review upon request. The Notice to Proceed shall not be granted unless the HASP has been accepted.
- Identify hazardous operations and chemicals related to the work to be performed in the HASP. The plan shall also describe methods and procedures that will be used to ensure a safe work environment, and how the contractor intends to protect both the health and safety of GRC and contractor employees, and Government

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

property and equipment. The contractor shall also provide current safety data sheets (SDSs) for all hazardous materials and chemicals brought onsite. Hazardous Waste Operations and Emergency Response (29 CFR 1910.120) has specific requirements for HASPs. The HASP content outline in Appendix C provides further guidance on the content of site-specific HASP. Appendix B provides an example for a short-duration task.

- Designate a site health and safety officer and/or safety manager who will ensure compliance with contract safety and health requirements for each prime contract
- Include, to the extent specified in the contract, safety responsibilities in subcontracts (All prime contractors shall monitor and document their subcontractors' activities to ensure compliance with all required safety and health regulations.)
- Coordinate all operations that involve safe access to hazardous work areas, shutdowns of mechanical and electrical equipment, testing, and interaction between the contractor and NASA operations personnel with the COR
- Provide fire extinguishers and other safety equipment as required, ensure that employees are trained in their proper use, and provide documented proof that employees have been trained upon request

6.2.2 SHed Requirements

Review, concur, and comment on contractor HASPs within 5 days for initial submittal; 2 days for resubmittals. Appendix E is a flow chart that illustrates the HASP review and acceptance process.

6.2.3 COR Requirements

The COR, or designee, reviews the contractor-submitted HASP and verifies that it accurately depicts the project scope of work and reviews requested resubmittals to verify that SHed comments have been addressed. The COR shall not issue the Notice to Proceed until the HASP has been concurred by both SHed and the COR.

6.3 Hazard Communication (29 CFR 1926)

6.3.1 Contractor Requirements

Contractors shall ensure that SDSs for each chemical stored at construction sites are located onsite and are available upon request.

6.3.2 SHed Requirements

SHed shall review and accept proposed chemicals and materials to be brought onsite by contractors and shall provide contractors with SDS for chemicals and materials owned by NASA at the construction work site.

6.3.3 COR Requirements

CORs shall verify and enforce that chemicals are stored properly by onsite contractors and that the SDS are kept at the construction site.

6.4 Occupational Safety and Health Administration (OSHA) Competent Person Verification (29 CFR 1926)

Contractors shall designate a competent person(s) for each planned operation in compliance with Occupational Safety and Health Administration (OSHA) standards and Environmental Protection Agency (EPA) regulations. Scaffolding shall not be erected, moved, dismantled, or altered except under the supervision of a trained, competent person.

6.5 Contractor Training Requirements (29 CFR 1926)

Contractors are responsible for ensuring that employees meet the following training requirements as required, and to the extent specified in the contract:

- Developing motivation, awareness, training, and certification programs in safety matters (including regularly scheduled safety meetings for supervisors, foremen, and other employees); documenting safety-related training in accordance with 29 CFR 1926 and OSHA requirements

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

- Recognizing and avoiding unsafe conditions and practices
- Emergency procedures, including plans, routes, assembly locations, and procedures to summon help utilizing emergency notification telephone numbers and systems hazard communications, blood-borne pathogens, chemical safety, GRC-specific hazards that may be encountered, and the procedures for employees that are required to enter confined and enclosed spaces (see the GRC Safety Manual)
- Proper use of fire extinguishers
- Site-specific safety orientation to all new employees (currently a PowerPoint presentation)
- Site-specific HASP requirements and signing the HASP to document training
- Industry-recognized, competent person, fall protection training for employees who work at 6 feet heights or greater

6.6 Inspection (*NPR 8715.3 and NPD 8820.2*)

The contractor shall provide access to contractor activities and/or operations to the Contracting Officer, SHED, Headquarters review teams, Federal compliance safety and health officers, and EPA compliance officers. The contractor shall provide access to SHED and the COR for announced and unannounced reviews of contractor operations.

6.6.1 Contractor Inspections

Except for maintenance projects that last one day or less, the contractor shall conduct and document daily safety inspections of the job site to ensure that the site and work practices are safe and done in accordance to the contractor's site specific HASP. Documentation shall be maintained at the job site. The Contractor shall close all self- and GRC-generated inspection findings in a timely manner.

SHED shall conduct frequent inspections of construction sites to verify site safety and compliance with applicable regulations. Inspections shall be documented and disseminated in the SHETrak database.

6.6.2 COR and/or CM/CI Technician Inspections

The COR and/or CM/CI technician shall conduct and document frequent inspections to verify safety and compliance with applicable regulations, and verify that contractors close findings in the SHETrak system in a timely manner.

6.7 Emergency Response Procedures

6.7.1 Lewis Field

In the event of fires, explosions, chemical spills, illness, injuries, and other emergencies, dial 911 from any internal telephone. A Lewis Field dispatcher will answer your call and dispatch the appropriate personnel and/or equipment. If you do not have access to an internal telephone, call (216) 433-8888 from a cell or other external phone.

If an emergency occurs, be prepared to relay the following information to the dispatcher:

- Location of the emergency
- Nature of the emergency (fire, medical, chemical, etc.)
- Number of persons injured

Remain on the line with the dispatcher until he or she releases you.

For nonemergency response, dial (216) 433-2088.

6.7.2 Plum Brook Station

In the event of fires, explosions, chemical spills, illness, injuries, and other emergencies, dial 911 from any internal telephone. A PBS dispatcher will answer your call and dispatch the appropriate personnel and/or equipment. If you do not have access to an internal telephone, call (419) 621-3222 from a cell or other external phone.

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

If an emergency occurs, be prepared to relay the following information to the PBS dispatcher:

- Location of the emergency
- Nature of the emergency (fire, medical, chemical, etc.)
- Number of persons injured

Remain on the line with the dispatcher until he or she releases you.

For nonemergency response, dial 4-3226 or (419) 621-3226

6.8 Mishap Investigation (NPR 8621.1)

The contractor shall:

- Report all accidents including near misses to the COR and SHED
- Report all incidents via the NASA Mishap Information System (NMIS) at <https://nmis.sma.nasa.gov/>, and initiate an investigation within 24 hours.

Note:

A Mishap is an unplanned event caused by GRC operations or GRC-funded development and research projects that result in at least one of the following:

- Injury to non-NASA personnel.
- Damage to public, private, or foreign property.
- Occupational injury or illness to NASA personnel.
- NASA mission failure prior to scheduled completion of the planned primary mission.
- Destruction of, or damage to, NASA property, except for a malfunction or failure of component parts or systems that fail before their fixed useful life has been met, provided the following are true: (1) preventative maintenance was adequate and (2) the sole action is to replace or repair the component.

A Close Call is an event that has a potential to cause a mishap, results in no injury or minor injury requiring first aid only, and less than \$20,000 in equipment and property damage.

Report safety data on mishaps, close calls, and lessons learned as required by the contract, in NPR 8621.1, NASA Procedures and Guidelines for Mishap Reporting, Investigating, and Recordkeeping, and in accordance with GRC and OSHA requirements. Contractor mishap investigations will be conducted in accordance with procedures as specified in the contractor's safety plan. NASA may conduct an independent mishap investigation based on the severity and requirements in NPR 8621.1. The Contracting Officer or the COR will evaluate and verify implementation of corrective actions.

6.9 Signs, Signals and Barricades (29 CFR 1926)

The contractor shall ensure that all construction signs are clearly displayed while construction is underway and contain company name, subcontractor names, and contractor emergency contacts. The contractor shall remove signs promptly when the project is completed. (Green construction signs shall contain the company name, subcontractor name, and the NASA COR with phone number).

The contractor shall ensure that all construction sites are barricaded as required In Glenn Safety Manual, Chapter 29, Safety Barricades.

6.10 Final Inspection (NASA-STD-8719.7 and NPR 8715.3)

Inspections including operational readiness, operational readiness review, test readiness review, pre-final, and final inspections shall include a safety and/or health representative.

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

All safety and health issues will be documented, resolved, or adequately controlled prior to acceptance, activation, and operation.

7.0 RECORDS

The following records are generated:

- SHED inspection documentation in the SHETrak database

8.0 REFERENCES

Document number	Document name
ANSI A 10	Construction Safety Services
29 CFR 1926	Safety and Health Regulations for Construction
NPD 8820.2	Design and Construction of Facilities
NPR 1800.1	NASA Occupational Health Program Procedures
NPR 8621.1	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
NPR 8715.3	NASA General Safety Program Requirements
NPR 8820.2	Facility Project Requirements
NASA-STD-8719.7	Facility System Safety Guidebook
NASA-STD-8719.11	Safety Standard for Fire Protection

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Glenn Research Center Glenn Safety Manual	Title: Construction Safety and Health	
	Document No.: GLP-QS-8715.1.17	Rev.: Revision C

APPENDIX A—DEFINITIONS AND ACRONYMS

Authority having jurisdiction (AHJ)—Individual(s) at GRC responsible for implementing the fire safety provisions of NPR 8715.3, and having the authority to approve and/or concur with associated installations, procedures, and equipment. The AHJ is appointed by the Center director.

Construction—Any activity that results in new buildings, structures, and facilities, or modifications to existing buildings, structures, and facilities, such as alterations and repairs; routine institutional maintenance; work on utility systems, process piping, facility equipment, and research hardware; painting or decorating

Construction of facilities—(CoF)

Construction Manager/Construction Inspector (CM/CI)

Contracting Officer—Authorized representative for administering contracts

Contracting Officer's Technical Representative (COR).—Individual designated by the contracting officer to act as his or her authorized representative in administering a contract

Environmental Protection Agency (EPA)

Experience modification rate (EMR)

Glenn Research Center (GRC)—Lewis Field and Plum Brook Station

Hazardous Waste Operations and Emergency Response (HAZWOPER)

Health and safety plan (HASP)

Hot work.—Any operation requiring the use of a flame-producing device, an electrically heated tool, or a mechanical tool that can produce sparks or heat to provide an initiation stimulus (see Chapter 28 the of the Glenn Safety Manual, Hot Work Authorization)

NASA Mishap Information System (NMIS)

NASA Policy Directive (NPD)

NASA Procedural Requirement (NPR)

Occupational Safety and Health Administration (OSHA)

Safety Data Sheet (SDS)

Site-specific HASP.—A plan developed to identify and ameliorate safety and health hazards at a specific location such as a construction site; the plan describes hazards that are likely to be encountered and develops procedures to either eliminate or control the hazards (see attached sample template).

Work stoppage authority.—Authority to immediately stop all work being performed at a job site; usually invoked when a situation of imminent danger exists that could result in serious injury to workers and/or personnel

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APPENDIX B—SHORT-DURATION HASP TEMPLATE

Job Hazard Analysis

1. Project Title:		2. Location:		3. Date:	
4. Task Description:					
5. Prime Contractor:			6. Competent Person and phone number:		
7. Sub Contractors:					
7a. NASA POC:					
8. Emergency information: Dial 911 internal or Lewis Field dial 216-433-8888 PBS dial 419-621-3222					
9. Work Activity		10 Hazard	11. Controls	12. PPE Required	13. Other Information
14. Prime Contractor Signature:			15. Title:		16. Date:

Daily Site Safety Coordination Review Instructions	Emergency Evacuation Procedures																								
<p>The Daily Site Safety Coordination Review shall identify the project title, location, Prime contractor, Competent person(s), sub contractors and the signature of the Prime Contractor who acknowledges that employees have read and understood the contents, have received the proper training and are qualified to perform the work project or activity.</p>	<p>Site superintendents and crew members are responsible for developing and discussing emergency evacuation procedures and alternatives in the event of an emergency at the work site. If someone becomes ill or injured at the worksite be prepared to provide the following information to the emergency dispatcher.</p>																								
<p>Blocks 1 – 8: Self explanatory</p>	<ol style="list-style-type: none"> 1. Nature of the accident, injury or illness 2. Location of the accident, injury or illness including building number and area 3. Contact person 4. Additional hazards specific to the work site. 5. Stay on the phone until the NASA Emergency Dispatcher releases the caller. 																								
<p>Block 9: Identify all tasks and procedures associated with this project on the date listed that have a potential to cause injury or illness to personnel or adjacent NASA personnel and damage to property or materials. Include emergency evacuation procedures.</p>	<p>The items listed above serve only as guidelines for the development of emergency evacuation procedures.</p>																								
<p>Block 10: Identify all known or suspect hazards associated with each respective task or procedure listed in block 8.</p>	<p>*****Number of Workers: *****Evacuation Meeting Location:</p>																								
<p>Block 11: Identify appropriate actions to reduce or eliminate the hazards identified in block 10. Control measures listed below are in order of preference</p> <ol style="list-style-type: none"> 1. Engineering controls (the most desirable method of control) 2. Substitution. For example, switching to a less hazardous chemical. 3. Administrative controls. For example, limiting exposure by reducing work schedule. 4. PPE (least desirable method of control) 	<p>Daily Site Safety Coordination Review and Emergency Evacuation Procedures Acknowledgement</p>																								
<p>Block 12: Identify any PPE that is required for each respective hazard identified in Block 10.</p>	<p>We, the undersigned site superintendent and crew members, acknowledge participation in the development of this Daily Site Coordination Review and accompanying emergency evacuation procedures. We have thoroughly discussed and understand the provisions of each of these documents:</p>																								
<p>Block 13: Identify any coordination issues that may present additional hazards.</p>	<table border="0"> <thead> <tr> <th>Signature</th> <th>Date</th> <th>Signature</th> <th>Date</th> </tr> </thead> <tbody> <tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr> <tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr> <tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr> <tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr> <tr><td>_____</td><td>_____</td><td>_____</td><td>_____</td></tr> </tbody> </table>	Signature	Date	Signature	Date	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
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<p>Block 14: The Daily Site Safety Coordination Review must be reviewed and approved by the Prime Contractor.</p>																									
<p>Block 15, 16: Self explanatory</p>																									

APPENDIX C—MINIMUM CONTENT FOR SITE-SPECIFIC HEALTH AND SAFETY PLANS

The following are the minimum requirements for a Site Specific Health and Safety Plan (HASP). Each plan shall be job specific and shall also address any unusual or unique aspects of the project or activity for which it is written. The HASP shall reflect the employer's corporate safety and health program.

1. Signature Sheet. Title, signature and phone number of the following:
 - a. Plan Preparer
 - b. NASA Representative: Review HASP to verify that scope of work is complete.
 - c. NASA Safety and Health Designee: Review document for compliance with OSHA. Review for impacts on adjacent NASA occupants.
2. Contractor Information
 - a. Prime Contractor
 - b. Contract or task number
 - c. Project Name
 - d. Accurate project description and location
3. Statement of Safety and Health Policy. Provide a copy of the current corporate/company Safety and Health Policy statement.
4. Responsibilities and lines of Authorities
 - a. Identification and accountability of personnel responsible for safety.
 - b. Competent persons
5. Subcontractors. Provide the following:
 - a. Identification of subcontractors
6. Training (Records available upon request)
 - a. List mandatory training and certificates that are applicable to this project (ex. Confined space, crane operator, respiratory protection, etc.) and any requirements for periodic retraining/recertification.
7. Safety and Health Inspections. Provide details on the following (Records available upon request):
 - a. Who will conduct safety inspections (ex. Project Manager, safety professional, supervisors), inspector's training/qualifications, frequency of inspections, process to record inspections, deficiency tracking system, follow-up procedures, etc.
 - b. Any external inspection/certifications that may be required.
8. Plans, Programs and Procedures
 - a. Emergency Response Plans
 - i. Procedures and posting of emergency phone numbers
 - b. Spill plans
 - c. Hazard Communication Program. Provide location of SDS's, records of employee training and inventory of hazardous materials (including approximate quantities and a site map) that will be brought onto Government property by Contractor and subcontractors.
9. Hazards Analysis and Controls
 - a. Listing of hazards identified for the task(s)

NOTE: A template for a HASP is included below. This is to offer the contractor a starting block of what GRC safety will require inputted for review. It is not a complete document covering all safety requirements that should be addressed in all circumstances.

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SITE SPECIFIC HEALTH AND SAFETY PLAN (Template)

Contractor Name:INSERT NAME

Project Name: **ADD** _____

Work Location: **ADD** _____

Task Number: **ADD** _____

Projected

Start Date: _____

Prepared By: Insert Name **Phone:** _____

Date Submitted: _____

INTRODUCTION: The purpose of this HASP is to set forth, in an orderly and logical fashion, appropriate health and safety procedures to be followed during onsite construction activities at the Glenn Research Center. During the performance of the task to be performed, this HASP identifies potential hazards which **Insert Company Name** personnel may be exposed to. **Insert Company Name** personnel **shall not participate** in this Task without having read this plan in its entirety. This plan has been developed to be as complete as possible, however, should conditions dictate revisions or additions to this plan, amendments shall be drafted, added, and distributed to all persons involved with this plan. This plan works in concert with the **Insert Company Name** Corporate "Safety

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and Health Plan”, the GRC Safety Manual, the GRC Occupational Health Manual, the GRC Environmental Programs Manual, OSHA standards CFR 1926, Environmental Protection Agency regulations, National Fire Protection Association Codes, and any other applicable codes stated in the NASA contract. It shall be the prime contractor’s responsibility to ensure that all of its subcontractors comply with the provisions set forth in this plan.

DESCRIPTION OF WORK:

COMPETENT PERSONS: Identify the Competent Person(s) responsible for oversight of a particular hazardous operation. The Competent Person is required to conduct daily, documented site inspections.

Competent Person(s)

Insert Name	

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IN CASE OF AN EMERGENCY

CALL 911 on a NASA Phone*

From a PAYPHONE or cell phone, dial (216) 433-8888.

***Dialing 911 from the NASA GRC phone system will connect to NASA emergency assistance.**

EMERGENCY CONTACTS

Emergency	Responder	Location	Phone
Fire:	NASA GRC Dispatch	Building 14	911
Police:	NASA GRC Security	Building 14	911
Ambulance:	NASA GRC Dispatch	Building 14	911
Hospital:	Southwest General Hospital	18697 Bagley Rd.	(440) 816-8888

Directions to Hospital: Brookpark Road east to Grayton Road, north to I-480, east to I-71, south to Bagley Road, right on Bagley Road

DAYS ONLY

Contractor's Contact: _____ Telephone: _____

NASA's Representative: _____ Telephone: _____

NASA's Representative: _____ Telephone: _____

NASA NON-EMERGENCY CONTACTS

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Dispatch:

(216) 433-2088

Safety and Health Division

(216) 433-3873

On Site phone dial 7 to obtain an outside line.

SUBCONTRACTOR(S): (List all subcontractors working on this activity)

SAFETY PLAN ACKNOWLEDGMENT:

I acknowledge that I have read and understand the attached safety and health plan and I agree to perform work on this task in accordance with this plan, safe work practices and OSHA regulations. I acknowledge that I have received a Glenn Research Center safety orientation.

Employee:	Company:	Date:

POSITION & RESPONSIBILITIES NAMES

Field Superintendent Insert Name_____

Safety Coordinator Insert Name_____

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WORK ACTIVITIES

POTENTIAL HAZARDS: (Identify those hazards that relate to the work activities noted above)

Chemicals or flammables	__Radiation (Contact Health Physics @3173)
__Scaffolding	__ Hand Rigging
__Traffic Control	__Biological
__Spills or Leaks	__Sanitation
__Ladders	__Egress
__Barricading	__Road Blockage
__Hazardous Energy (LO/TO)	__Utility Service Interruption (Area Clearance Req'd)
__Demolition	__ High Pressure Systems
Cranes/Aerial	__Hot Work (Permit Req'd)
__Eye, face, or Head Hazards (PPE)	__ Cryogenic Spills, Burns
__ Power Tools	__Confined Space Entry (Permit Req'd)
__Falls (Heights > 6')	__Special Hazards – ACM, 3&4_Other Pinch points/ hands and feet.
__ Respiratory Hazards	
__Excavation (Permit Req'd)	

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PROPOSED CONTROLS: (Work practices, personal protective equipment, training, and/or emergency procedures that will be used to ensure the safety of workers, and on-site personnel, against the hazards identified above.)

1.
2.
3.
4.

COMPETENT PERSONS: Identify the Competent Person(s) responsible for oversight of a particular hazardous operation. The Competent Person is required to conduct daily, documented site inspections.

Competent Person(s)

Insert Name

Subcontractor(s): (List all subcontractors working on this activity.)

Company Name

ATTACH SDS'

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APPENDIX D—GENERAL SAFETY AND HEALTH SPECIFICATION

SECTION 01 35 26.98 GENERAL SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

The requirements of this Section apply to, and are a component part of, each section of the specifications.

1.2 REFERENCES

The documents listed below are incorporated by reference into this contract as if fully rewritten herein.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction

CORPS OF ENGINEERS (COE)

COE EM-385-1-1	(1981; Rev 1984) Safety and Health Requirements Manual
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

NASA NPR 8621.1	(2006b; Change 7) NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
NASA NPR 8715.3	(2008c; Change 9) NASA General Safety Program Requirements
GLM-QS-1700.1	Glenn Research Center, Safety Manual
GLM-QS-1800.1	Glenn Research Center, Occupational Health Programs Manual

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Records shall be submitted in accordance with paragraph entitled, " Gas Protection," of this section.

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SD-07 Certificates

Statements shall be submitted for the following items in accordance with paragraphs entitled, "Safety Plan" and "Protection Plan," of this section.

Site Specific Health and Safety Plan; G Protection Plan; G Construction Project Training Summary Report; G Construction

Project Training Summary Report; G

Training certifications for fall protection competent person.

Steel Erection Plan; G

1.3.1 Site Specific Health and Safety Plan

Contractor shall submit a site specific safety plan to the Contracting Officer for approval within 10 working days after award of contract and it shall be approved prior to notice to proceed. Compliance to the safety plan is mandatory. A copy of this approved plan shall be maintained on the construction site.

The Site Specific Health and Safety plan shall include, as a minimum, the following:

- a. Health and Safety program objectives.
- b. Description of work.
- c. Methods to attain safety objectives.
- d. Responsibility of key personnel for the Contractor.
- e. List of subcontractors and their competent persons.
- f. Safety meetings, surveys, inspections, and reports.
- g. Identification of safety hazards and mitigation plan to allow for safe conduct of work. If the hazard cannot be mitigated, include specific PPE that shall be worn. When selecting hazard control methods and personal protective equipment (PPE) to limit workers exposures the most restrictive occupational exposure limits (OELs) shall be used. The most restrictive OELs of the following shall be used: OSHA permissible exposure limit (PEL), ACGIH threshold limit value (TLV), and American Industrial Hygiene Association (AIHA) workplace environmental exposure limits (WEELs)
- h. Emergency plan including emergency number and muster locations.
- i. Lists of key personnel to be contacted in times of emergency.
- j. Program to show compliance with Federal OSHA Safety and Health Standards 29 CFR 1910 and 29 CFR 1926 and various safety requirements of NASA NPR 8715.3. This shall include an overall site Fall Protection Plan that demonstrates that the requirements

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and criteria for fall protection in construction workplaces covered under 29 CFR part 1926 will be met for every activity taking place during the project.

- k. Methods to comply with the requirement for immediate reporting of mishaps to the Contracting Officer in accordance with NASA NPR 8621.1. This document is available at: [http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N PR 8621 001B &page_na](http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N+PR+8621+001B&page_na)
- l. Procedures for emergency actions to be taken to secure dangerous conditions, to protect personnel, and secure work areas in the event of accident or an act of nature.
- m. Procedures for securing the mishap site so that the area remains secure until arrival of a safety investigator. Mishap site will remain secured until released by the Contracting Officer.
- n. Provide MSDS sheets for all chemicals which will be used. Methods for handling and storage shall be identified.
- o. Identify the competent person and the competent person for specific activities as required by 29 CFR 1926.
- p. The Health and Safety plan shall be reviewed and signed by all site personnel.
- q. Daily documented site safety inspections shall be performed and documented.
- r. A C-979 Fall Prevention Plan form shall be completed if the workers are working at a height of 6 feet or greater.
- s. If the prime contractor is writing the HASP for a subcontractor, then the subcontractor shall submit documentation on company letterhead indicating that they concur with the HASP and are able to comply with all controls and personal protective equipment requirements as specified by the prime contractor.

1.3.2 Protection Plan

Structures, utilities, sidewalks, pavements, and other facilities immediately adjacent shall be protected against damage.

1.3.3 Construction Project Training Summary Report

The contractor shall provide a submittal of an up-to-date Construction Project Training Summary Report containing worker's names, employers, assigned tasks, qualifying training, certifications, and dates of training for a prime and subcontractor workers to be on site. The submittal shall include a statement from the prime contractor stating that the construction workers have undergone a qualifications review and verified as being qualified for assigned tasks while at the GRC construction site. The Construction Project Training Summary Report shall be updated and submitted monthly. The Construction Project Training Summary Report shall be reviewed and accepted by the Project Team through the Contracting Officer's Representative (COR) and then to the Contracting Officer (CO). The status of

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the Construction Project Training Summary Report shall be incorporated into the project meeting minutes and shall document any Project Team comments.

1.3.4 Steel Erection

Provide a steel erection plan per 29 CFR 1926.752 prior to the beginning of any steel erection operation.

1.4 SAFETY SUPERVISION

Contractor's Safety Supervisor shall ensure that:

- a. NASA fall protection requirements are included in work instructions where NASA employees and/or contractors will be working in situations that require fall protection.
- b. Ensure that anyone who is identified as a qualified person (per ANSI/ASSE Z359.0-2007, paragraph 2.109) to serve as a subject matter expert in fall protection has an engineering degree or access to a person with an engineering degree to identify and to evaluate unique situations and nonstandard equipment and has been trained by an industry-recognized trainer, NASA-recognized trainer/training center, or NASA-developed training program equivalent to ANSI- and OSHA-compliant training (Ref: ANSI/ASSE Z359.2 -2007 Section C.5).
- c. For each situation that requires fall protection, ensure that there is a competent person (per ANSI/ASSE Z359.0-2007, paragraph 2.27) assigned responsibility for the immediate application of fall protection work where fall protection is required whose education and training has been administered by an industry-recognized trainer, NASA-recognized trainer/training center, or NASA-developed training program equivalent to ANSI and OSHA compliant training. Fall protection competent person shall be on site 100% of the time active fall protection is being used.
- d. Construction personnel are performing work in compliance with the approved site specific health and safety plan.

1.5 GENERAL SAFETY PROVISIONS

The GRC Safety Manual, GLM-QS-1700.1, is available online at <http://smad-ext.grc.nasa.gov/shed/pub/gsm/gsm-manual.pdf>.

The GRC Occupational Health Programs Manual, GLM-QS-1800.1, is available on-line at <http://smad-ext.grc.nasa.gov/shed/pub/ohpm/ohpm-manual.pdf>

These documents are incorporated by reference into this contract as if fully rewritten herein.

The Contractor and all subcontractors are subject to applicable federal, state, and local laws, regulations, ordinances, codes, and orders relating to safety and health in effect on the date of this Contract.

During the performance of work under this Contract, the Contractor shall comply with procedures prescribed for control and safety of persons visiting the project site. Contractor is responsible for his personnel and for familiarizing each of his subcontractors with safety requirements. Contractor shall advise the Contracting Officer of any special safety

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restriction he has established so that Government personnel can be notified of these restrictions.

All contractor and subcontractor employees shall sign the HASP to document that they understand and will comply with the contents.

Contractor shall comply with the requirements of NASA NPR 8715.3. This document is available at http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_8715_003C_&page_name=main

The contractor shall protect workers who may be exposed to a fall of six feet or greater to a lower level for construction activities. This requirement is more stringent in some cases than that required by 29 CFR 1926, such as for steel erection.

1.6 SAFETY LOCKOUT/TAGOUT PROCEDURES

Contractor shall ensure that each employee is familiar with and complies with these procedures as listed in Chapter 9 Lockout/Tagout of the Glenn Safety Manual, GLM -QS -1700.1, and 29 CFR 1910.147.

Contracting Officer or designee shall, at the Contractor's request, have proper isolation of sources of hazardous energy performed by on-site personnel because of the experience and knowledge necessary to make the particular equipment safe to work on. The contractor shall then perform the required lockout/tagout using red bodied locks and, GRC furnished, GRC946A Danger Do Not Operate tags, at all final points of isolation.

No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout red lock and tag attached to it, nor shall such locks and/or tags be removed except by the employee that attached them (Except in an emergency situation, see Chapter 9 Lockout/Tagout of the Glenn Safety Manual, GLM -QS -1700.1).

No person shall work on any equipment that requires a lockout/tagout red lock and tag unless he/she has placed their personal, red bodied, lock at the final point of isolation.

Any individual, regardless of position or authority, who is required to be protected by lockout/tagout shall place their personal, red bodied, lock at the final point of isolation.

Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions. An established safe work condition exists when (1) sources have been isolated, (2) lockout/tagout has been performed, (3) verification using the hot-dead hot method has been accomplished, and (4) grounding (if required) has been completed.

Before clearance will be given on any equipment, the apparatus, valves, electrical circuits, or systems shall be secured in a passive condition with the appropriate vents, pins, and/or locks.

Pressurized or vacuum systems shall be vented to relieve differential pressure completely.

Vent valves shall be tagged and locked open during the course of the work.

Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry.

ACCIDENT TREATMENT AND RECORDS

Contractor shall post emergency first aid and ambulance information at project site.

Emergency response shall require the Contractor to call 911 on a NASA phone or 216 433-8888 (LF) or 419-621-3222 (PBS) on an outside line.

1.7 FIRE PREVENTION AND PROTECTION

Open-flame heating devices will not be permitted except by approval in writing from the Authority Having Jurisdiction (AHJ) at GRC. Approval for the use of open fires and open-flame heating devices will not relieve the Contractor from the responsibility for any damage incurred because of fires.

Burning trash, brush, or wood on the project site shall not be permitted.

All hot work operations shall comply with NASA GRC Safety Manual, Chapter 28, Hot Work Authorization. Prior to hot work, a C-7a Hot Work Authorization Permit shall be issued by the Safety and Health Division. Immediately prior to hot work operations, a C-7b form and associated inspection shall be completed by the responsible person.

Contractor shall discontinue burning, welding, or cutting operations 1 hour prior to the end of the normal work day. A workman shall remain at the site for 1 hour after discontinuing these operations to make thorough inspection of the area for possible sources of latent combustion. The Contractor shall be equipped with the appropriate fire extinguishers and shall be trained in the proper use of fire extinguishers. Any unsafe conditions shall be reported to SHED. (Telephone: (216) 433-2088)

1.8 ELECTRICAL

Contractor shall appoint an individual responsible for the electrical safety of each work team to restrict entry to dangerous locations to those authorized by him jointly with the Government.

1.9 UNDERGROUND UTILITIES

A Confined Space Entry Permit, NASA C-199, as per Chapter 16 of the Glenn Safety Manual is required before any Contractor personnel enters a manhole. Contractor shall contact the Contracting Officer for support services by calling (216) 433-8888 at least 72 hours in advance.

Contractor shall be responsible for removing water and debris before commencement and during execution of work in manholes.

1.10 RADIATION SAFETY REQUIREMENTS

License Certificates for radioactive materials (RAM) and equipment shall

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be submitted for all specialized material and equipment per Chapter 8 of the Glenn Occupational Programs Manual. As a Federal facility, GRC falls under the jurisdiction of the NRC. Radiography companies shall possess an NRC license or NRC reciprocity for their state license. Individuals performing source radiography shall have a radiography license issued by the NRC to perform such work at GRC, a Federal reservation. Alternatively, a state license with a reciprocity agreement from the NRC shall be acceptable. Portable nuclear moisture/density gauge users shall have a RAM license issued by the NRC, or alternatively, by a comparable state agency with an NRC reciprocity agreement.

Operations performed by the Contractor which utilize nuclear density gauges and/or source radiography shall be included in the HASP. The NASA GRC Radiation Safety Officer shall review and approve aspects of the contractor's HASP or "radiation safety plan" related to using RAM.

Workers shall be protected from radiation exposure in accordance with 10 CFR 20. Standards for Protection Against Radiation

Loss of radioactive material shall be reported immediately to the Contracting Officer.

Actual exposure of the radiographic film or unshielding the source shall not be initiated until after 5 p.m. on weekdays.

In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, no assumptions shall be made as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, a fully instructed employee shall be positioned inside such building or area to prevent exiting while external radiographic operations are in process.

1.11 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the Government shall not be closed or obstructed without written permission from the Contracting Officer. Any closure of a road, sidewalk or parking spots requires submittal of a Barricade Request Form.

1.12 DIGGING, TRENCHING, AND/OR EXCAVATION

Prior to performing any excavation work or any surface penetrations on any ground surface, the Contractor shall obtain from the Facilities Division an Excavation Permit (C 927). The Contractor shall comply with GRC Safety Manual, Chapter 35, Digging, Trenching, & Excavating Procedure and Requirements.

Contractors must obtain a C927 Excavation Permit for any penetration into surface at GRC. Each permit is limited to a 400 linear foot section or approximately 1 acre as determined by the COR and NASA Civil Systems Manager. The permit will only be valid for 3 months or after work is complete within the permit defined area, whatever comes first. The government shall be responsible to fill out part A. The Prime Contractor and Excavation Contractor shall be responsible to fill out portions B-C of permit when required by COR.

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The contractor shall be required to acquire a Professional Ohio Surveyor to stake out all proposed infrastructure work. The contractor shall also be required to mark excavation with white temporary marking paint prior to receiving approved Excavation C927 Permit.

Permit portion B1 is the Utility Verification and Marking log. The contractor is required to track utility markings and request them every two weeks or sooner if necessary. See GRC Excavation Manual for further information.

Permit Portion B2 is the Potholing log. The contractor is required to verify (pothole) all utilities as identified on the Underground Record Drawing (URD) prior to completing infrastructure excavation. This log verifies all utilities are properly identified and protected. See GRC Excavation Manual and GRC Safety Manual for further information on Potholing requirements.

Permit portion C is Daily Field Tag Up Meetings. The contractor is required to hold daily coordination meetings with excavation personnel to coordinate work activities for the day witnessed by NASA Construction Manager and/or Inspector. During these meetings the area of work shall be addressed. The contractor will be limited to this area as discussed during the day. See GRC Excavation Manual for further information.

The Requestor is a member of GRC organization or support service contractor which will monitor the excavation activities. The requestor shall:

Initiate a NASA Form filling out Part A step 1 of the GRC927, Digging, Trenching, and Excavating on Permit, and submitting it electronically using the GRC927 submit button function.

Ensure the Contractor Competent Person designated for this activity has the NASA GRC Excavation Manual and has read the manual thoroughly and verify the competent person has the knowledge and training required by the GRC Excavation Manual.

Ensure the Contractor Excavator operator has NASA GRC Excavation Quick Reference card and understands all utility markings.

Ensure that all personnel working at the jobsite are trained and aware of the hazards of digging, trenching, excavating and ground penetration. Ensure that all items outlined in the permit are properly defined and resolved prior to operations involving digging, trenching, excavating activities to avoid damage to utilities and structures identified on the construction drawings.

Notify the Emergency Dispatch and their supervisor (if a civil servant) or their COR (if a contractor) if an unexpected underground utility or structure is found during the activity or if an underground utility or structure is hit or broken during the activity (The requestor shall notify the emergency dispatch at 911 if using a NASA internal telephone or if using a cell phone dial 216-433-8888 at Lewis Field or 419-621-3222 at Plum Brook Station.) It is the Supervisor's or COR's responsibility to notify SHeD.

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Comply with all the requirements of the above listed reference documents and other regulations in regard to safe performance of the job.

Coordinate their work with the lab utilities to assure that related activities such as utility shutdown are addressed

Attends daily tag up meetings held by contractor competent person, and contractors excavation personnel to ensure all aspects of excavation work are discussed and coordinated all portions of C927 and filled out properly;

Ensure all work ceases if problems are found until such time as the excavation is made safe again for entry

The Contractor performing the excavation and/or utility work shall ensure a competent person to oversee each permitted excavation (GRC927). This person shall be at the physical excavation site 100% of the time comparing construction documents to the Underground Record Drawings (URD), auditing the excavation process, evaluating utility markings, evaluating symbols versus details and ensuring the permit process is followed. The contractor shall submit an official document stating the compliance and qualifications of competent persons. The excavation competent person period will expire at the end of each contract and/or every three years, whatever is more stringent. The following are minimum requirements:

Excavation Competent Person Mandatory Qualifications:

- a. Has a working knowledge of trenching, excavation, horizontal directional drilling, underground construction, shoring, and soil types as appropriate to the assigned task.
- b. Has the ability to assure that all underground utilities are located, field verified, and clearly marked prior to excavation.
- c. Is knowledgeable in applicable excavation regulations to include OSHA 29CFR1926. Have knowledge of trench collapse prevention, ventilation and air monitoring requirements (where applicable), ground water control, personal protective equipment, and emergency procedures as they pertain to underground construction and utility work. A minimum 5 years excavating experience is required.
- d. Has the ability to notify the prime contractor or Government (as applicable) of any nonconformance issues and document them; and to provide any corrective actions to mitigate hazards or nonconformance issues.
- e. Successful completion of GRC Excavation 101 Course GRC-012-15.

Utility Competent Person Mandatory Qualifications:

- a. Has a working knowledge of trenching, excavation, horizontal directional drilling, underground construction, shoring, and soil types as appropriate to the assigned task.
- b. Has the ability to assure that all underground utilities are

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located, field verified, and clearly marked prior to excavation for proposed infrastructure or infrastructure repair.

- c. Is knowledgeable in applicable excavation regulations to include OSHA 29CFR1926. Have knowledge of trench collapse prevention, ventilation and air monitoring requirements (where applicable), ground water control, personal protective equipment, and emergency procedures as they pertain to underground construction and utility work. A minimum 5 years excavating experience is required.
- d. Has the ability to notify the prime contractor or Government (as applicable) of any nonconformance issues and document them; and to provide any corrective actions to mitigate hazards or nonconformance issues.
- e. Has the ability to review, understand, and interpret Underground Record Drawings, contract drawings, and specifications.
- f. Successful completion of GRC Excavation 101 Course GRC-012-15.
- g. Has the ability to oversee and witness underground construction and utility work to ensure that established processes are followed. A minimum of 5 years utility installation experience is required.
- h. Has working knowledge of hydro-testing and pigging, as well as welding and fusion procedures, as appropriate to the assigned task.
- i. Is knowledgeable in applicable rules and regulations to include 29CFR1926 and installation of utilities such as domestic water (i.e. fire hydrants, thrust blocks, testing, cleaning and chlorination), sewers, duct banks, natural gas, and other pressure pipes, as appropriate to the assigned task.
- j. Is capable of identifying existing and predictable hazards in the surroundings of underground utility construction and understanding the corrective measures to eliminate them.

Excavations greater than 4 ft in depth may be considered to be confined spaces. As such, these shall be evaluated by SHED with regard to existing and potential hazards to determine if the excavation shall be considered a permit-required confined space. Further regulations regarding confined spaces follow:

Below 4 and 20 ft, SHED shall evaluate and determine if an excavation is to be considered a permit-required confined space based upon the known and potential hazards.

Below 20 ft in depth, all excavations shall be considered to be permit-required confined spaces and the requirements of the Glenn Safety Manual, Chapter 16, Confined Space Entry, shall be in effect.

Confined Space Entry Training shall be required if an excavation has been determined to be a Permit-Required Confined Space. Employees who work in or around excavations must be provided training according to their work activities.

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GRC adheres to ORC 3781.30, in addition GRC has established a tolerance zone surrounding all underground utilities. The tolerance zone is the total width of the underground utility plus 18 inches on each side. The vertical tolerance zone extends from the elevation shown on the utility profile and/or underground record drawing to 24 inches above the top edge and 24 inches below the bottom edge of the utility.

Methods of excavation within the tolerance zones are hand digging, vacuum excavation, and hydro excavation. Potholing of all utilities for verification is required prior to infrastructure excavation. The GRC Civil Systems Manager may grant a waiver for potholing however the contractor is still required to excavate in accordance with the tolerance zone requirements. See NASA GRC Excavation manual for further information.

NASA Civil System Manager, NASA COR, and the NASA Health and Safety Office will strictly monitor digging, excavation, trenching and ground penetration activities to ensure compliance with the Excavation permit. Significant discrepancies shall be documented in the SHETrak System.

All permits and associated documentation issued for the purpose of controlling digging, trenching, excavating and ground penetration activities shall be considered part of the construction and/or task documentation. Records retention requirements shall be governed by those of the construction and/or task documents or contract.

Completed Excavation Permits shall be submitted in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, in sufficient detail to show full compliance with the specification. Contractor is responsible to submit the permit in its entirety as a submittal to the Government once the permit is expired and/or terminated along with all associated subsurface infrastructure as-built information installed and obtained as part of this permit. Permit and as-built submittal is required 10 business days after permit expiration or termination.

The contractor shall submit the utility as-builts for newly installed utilities and surface features along with any existing utility information collected as part of the excavation permit process. The applicable as-builts shall be submitted to the government for approval within 10 days after each completion of the excavation permit (GRC 927). A complete set of as built will be required at completion of project. The As-Built redlines must be completed on official construction drawings. Lines, letters, and details shall be sharp, clear, and legible. Additions or corrections to the drawings shall be drawn to the scale of the original drawing.

1.13 GAS PROTECTION

Contractor shall have one or more employees properly trained in operation of gas testing equipment and formally qualified as gas inspectors who shall be on duty during times workmen are in confined spaces. Their primary functions shall be to test for gas and operate testing equipment. Unless equipment of constant supervisory type with automatic alarm is employed, gas tests shall be made at least every 2 hours or more often when character of ground or experience indicates gas may be encountered. A gas test shall be made before workmen are permitted to enter the

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excavation after an idle period exceeding one-half hour.

Readings shall be permanently recorded daily, indicating the concentration of gas, number and location of drilled piers, point of test, date, and time of test.

All gas detection equipment shall be calibrated as per the manufacturer's requirements. Documentation of this calibration shall be made available to the Government upon request.

Special requirements, coordination, and precautions will apply to areas that contain a hazardous atmosphere or, by virtue of their use or physical character, may be oxygen deficient. The contractor shall not enter a confined space that is oxygen deficient or may be immediately dangerous to life and health.

1.14 ROOFING AND COATING

At the beginning of each work day the Contractor shall check with the Contracting Officer before proceeding to work on the roof to ensure safe work conditions.

1.15 HIGH NOISE LEVEL PROTECTION

Operations performed by the Contractor that involve the use of equipment with output of high noise levels (jackhammers, air compressors, and explosive device activated tools) shall be scheduled for after duty working hours. Use of any such equipment shall be approved in writing by the Contracting Officer prior to commencement of work.

1.16 LASER

Operations performed by the Contractor which utilize lasers shall be included in the HASP. Laser operations shall only be performed during daylight hours. For further requirements, see GRC Occupational Health Program Manual Chapter 13, "Laser Safety," at <http://smad-ext.grc.nasa.gov/shed/pub/ohpm/ohpm13-laser.pdf> .

1.17 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor shall:

- a. Secure outside equipment and materials and place materials possible to damage in protected locations.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- c. Ensure that temporary erosion controls are adequate.

1.18 CONFINED SPACE

Comply with the requirements in Chapter 16 of the GRC Safety Manual, 29 CFR 1910.146.

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Prior to a permit required confined space entry, a confined space permit C-199 form shall be submitted for approval from SHED. All contractors involved with entry into or working in confined spaces shall have training in confined space entry.

- a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See SHED for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee.
- b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained.
- c. Manholes and excavations require continuous atmosphere monitoring with audible alarm for toxic gas detection and low oxygen levels.
- d. Include training information for employees who will be involved as entrant attendants for the work.
- e. Entry Permit. Use C-199, completed by the qualified person.
- f. Post the permit in a conspicuous place close to the confined space entrance.

1.19 MISHAP INVESTIGATIONS

Refer to NASA Procedural Requirement (NPR) 8621.1 Mishap and Close Call Reporting, Investigating, and Recordkeeping. If a mishap occurs during the project that requires investigation per NPR 8621.1 the mishap site, which may include the entire construction work area, may be secured by NASA and not released to the Contractor for up to 75 working days. **Contractor shall not be entitled to additional payment for any expenses incurred as a result of the investigation.** Contractor shall submit a schedule recovery plan once the site is release back to the Contractor showing how the remaining work will be accomplished within the current contract period. If the Contractor determines the schedule cannot be recovered within the current contract period, a contract extension may be negotiated at no cost to the Government.

1.20 FALL PROTECTION

It is NASA's policy to provide fall protection for any walking working surface where a person is exposed to a fall to a lower level. Fall protection programs shall focus on eliminating the fall hazard before an individual is exposed to the hazard.

- a. Fall protection programs shall protect workers who may be exposed to a fall six feet or greater to a lower level for all construction activities - including steel erection.
- b. For work within 6 feet of an edge, on low-slope roofs, protect personnel from falling by use of personal fall arrest systems, guardrails, or safety nets. A safety monitoring system is not

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adequate fall protection and it not authorized.

- c. "Fall hazards" from any height to lower level shall require protection if the work is over a collateral hazard (e.g. moving machinery, chemicals, electrical hazards, impalement hazards).

Competent person: For each situation that requires fall protection at GRC, there is a competent person (per ANSI/ASSE Z359.0-2007, paragraph 2.27) assigned responsibility for the immediate application of fall protection work where fall protection is required whose education and training has been administered by an industry-recognized trainer.

The fall protection competent person shall be on the construction site 100% of the time that active fall protection is being used.

Written Fall Protection Plan: specific fall protection requirements, including rescue plans, shall be developed and submitted to NASA for approval, using the C-979 Fall Prevention Plan form, as an appendix to the Health and Safety Plan.

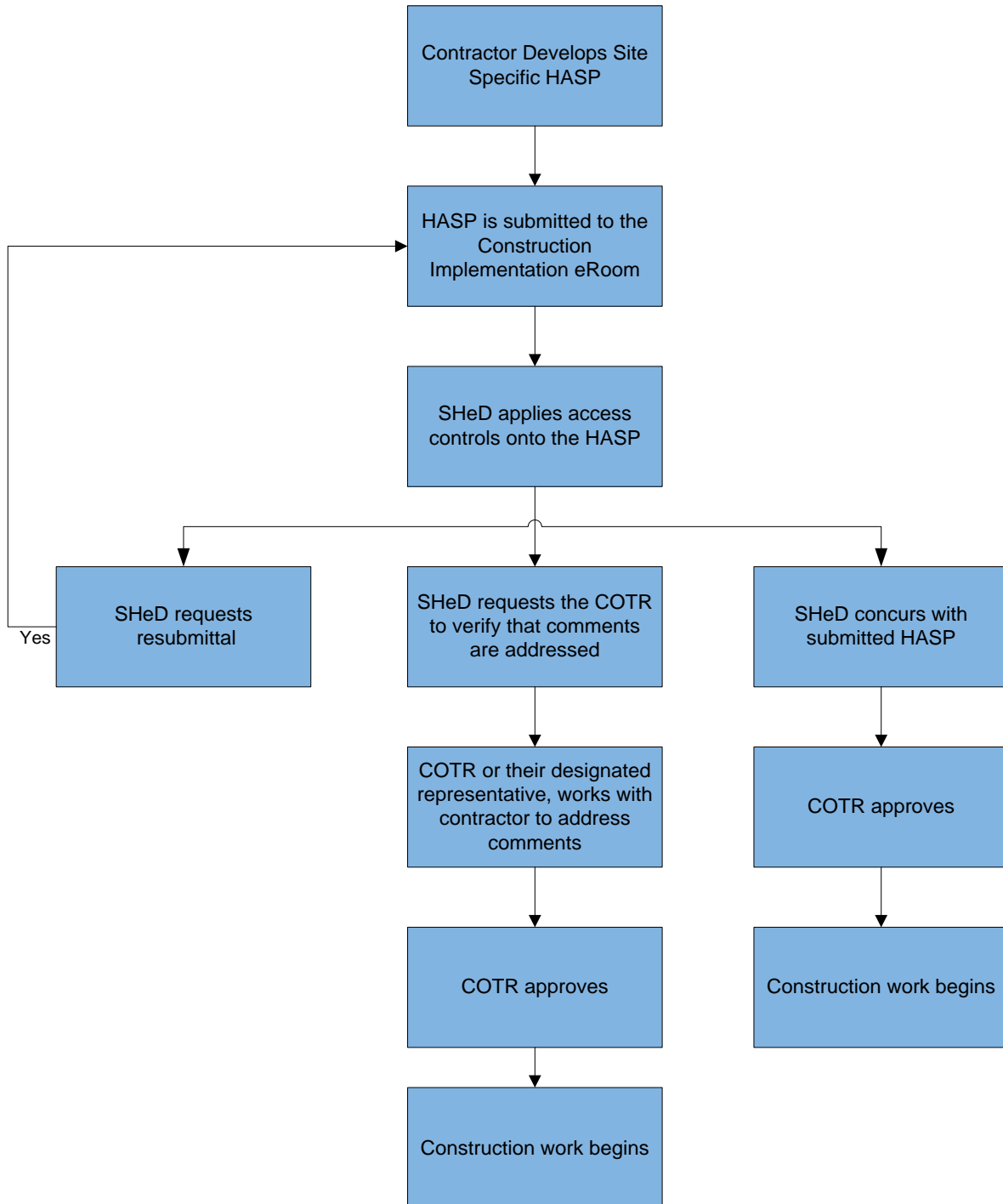
PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

APPENDIX E—HEALTH AND SAFETY PLAN (HASP) SUBMITTAL PROCESS FLOWCHART



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